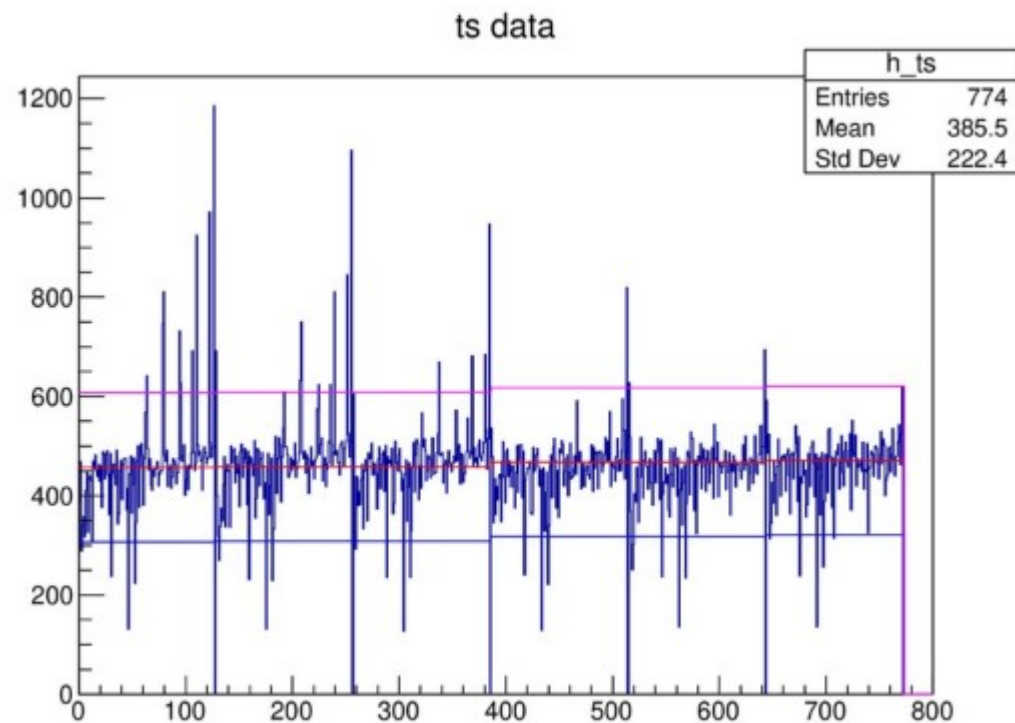


# Negative Signal Overview

Sean Jeffas  
January 26th, 2022

# Raw Events Negative Signals

- Negative signals have only been seen in the hall setup.
- They would confuse the common mode calculation, and decrease the final result.
- This will cause signals to seem higher than expected, so no real signals should be lost.

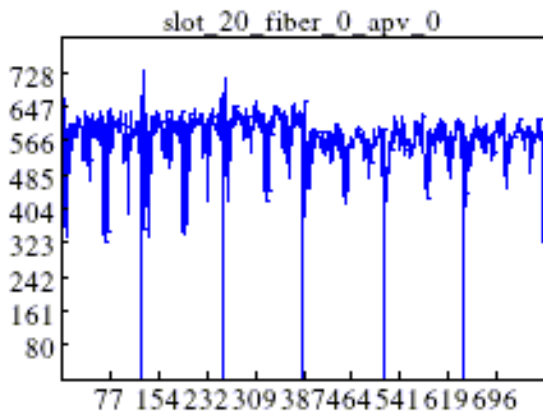


# Current Available Data

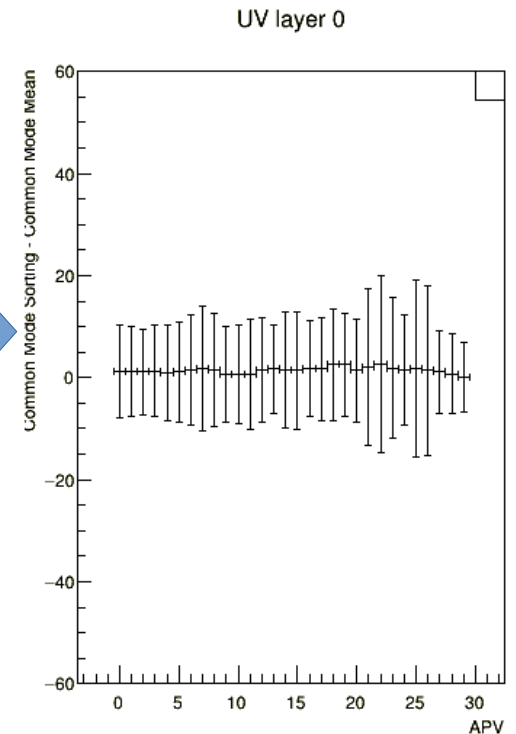
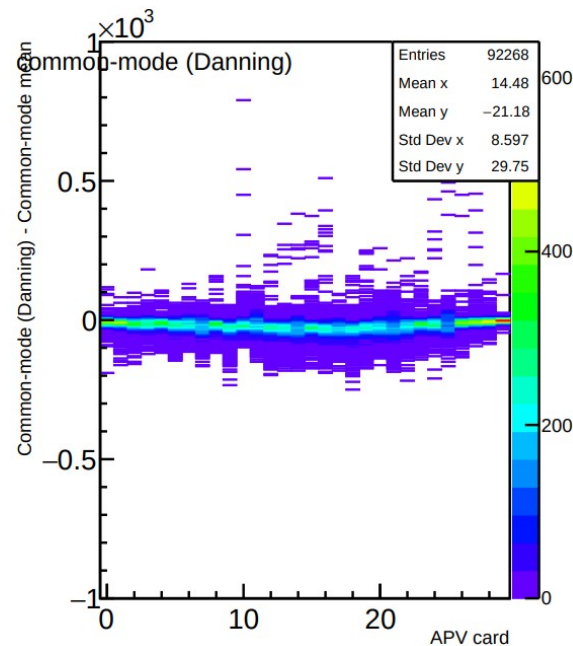
- 1, 3, and 5  $\mu\text{A}$  runs on LH2, with only 50k events with zero suppression.
- 6M events cosmic run with full readout.
- Pedestal data

# Full Readout Events

- Every 1/100 events have full readout, with no corrections.
- These events are used to make some histograms, but none of the data is saved.
- Will require more thorough analysis to understand the negative pulse impact.
- The plots shows how the online CM calculation compares to the pedestal CM calculation.
- Recall that signals greater than 50 ADC usually pass zero suppression.

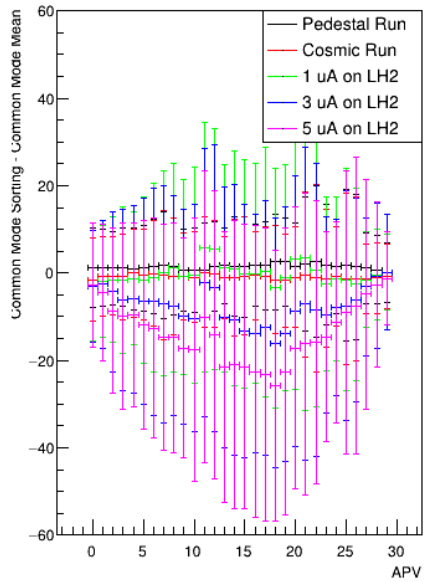


Analyzer

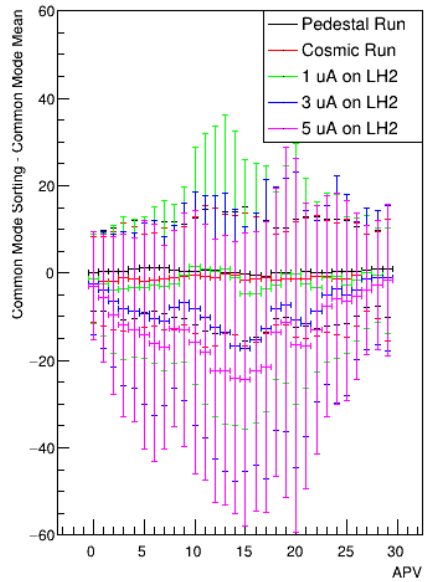


# CM Distribution Sagging

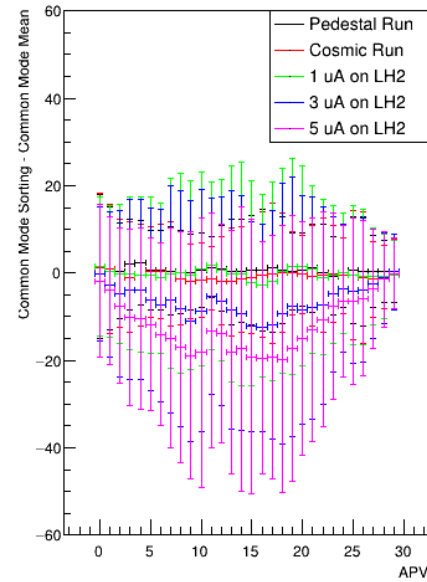
UV layer 0



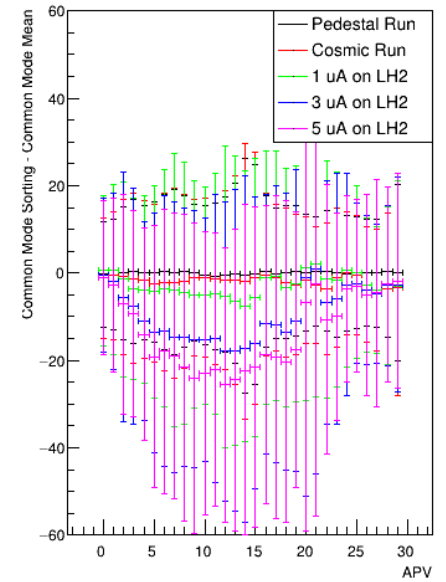
UV layer 1



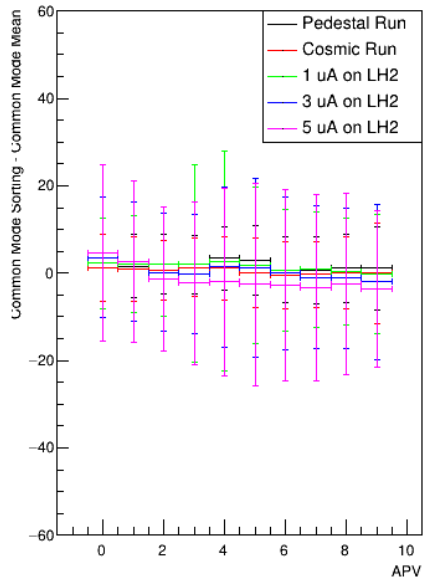
UV layer 2



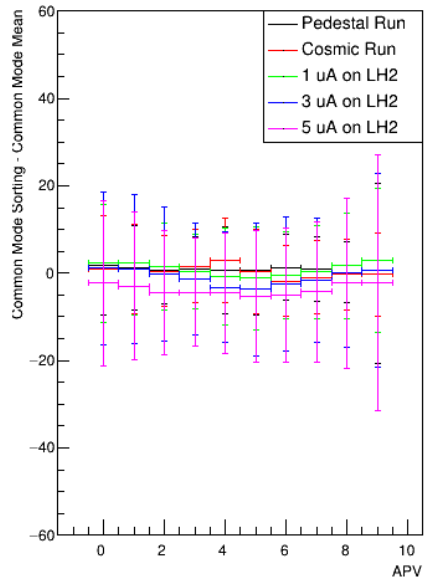
UV layer 3



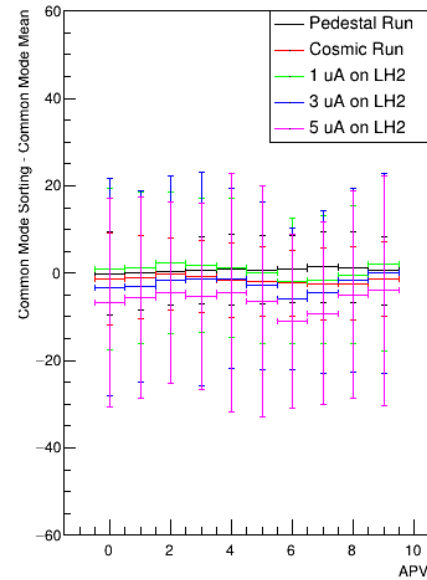
XY module 0



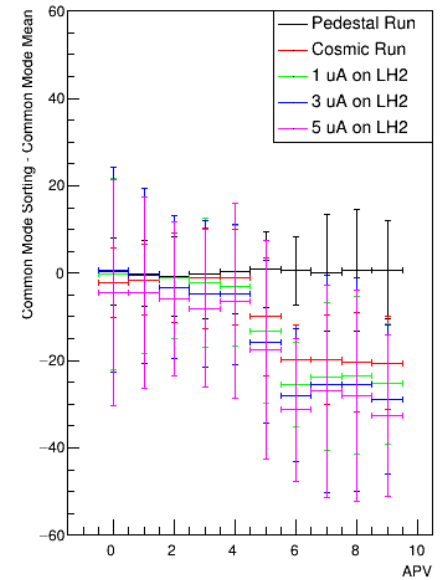
XY module 1



XY module 2

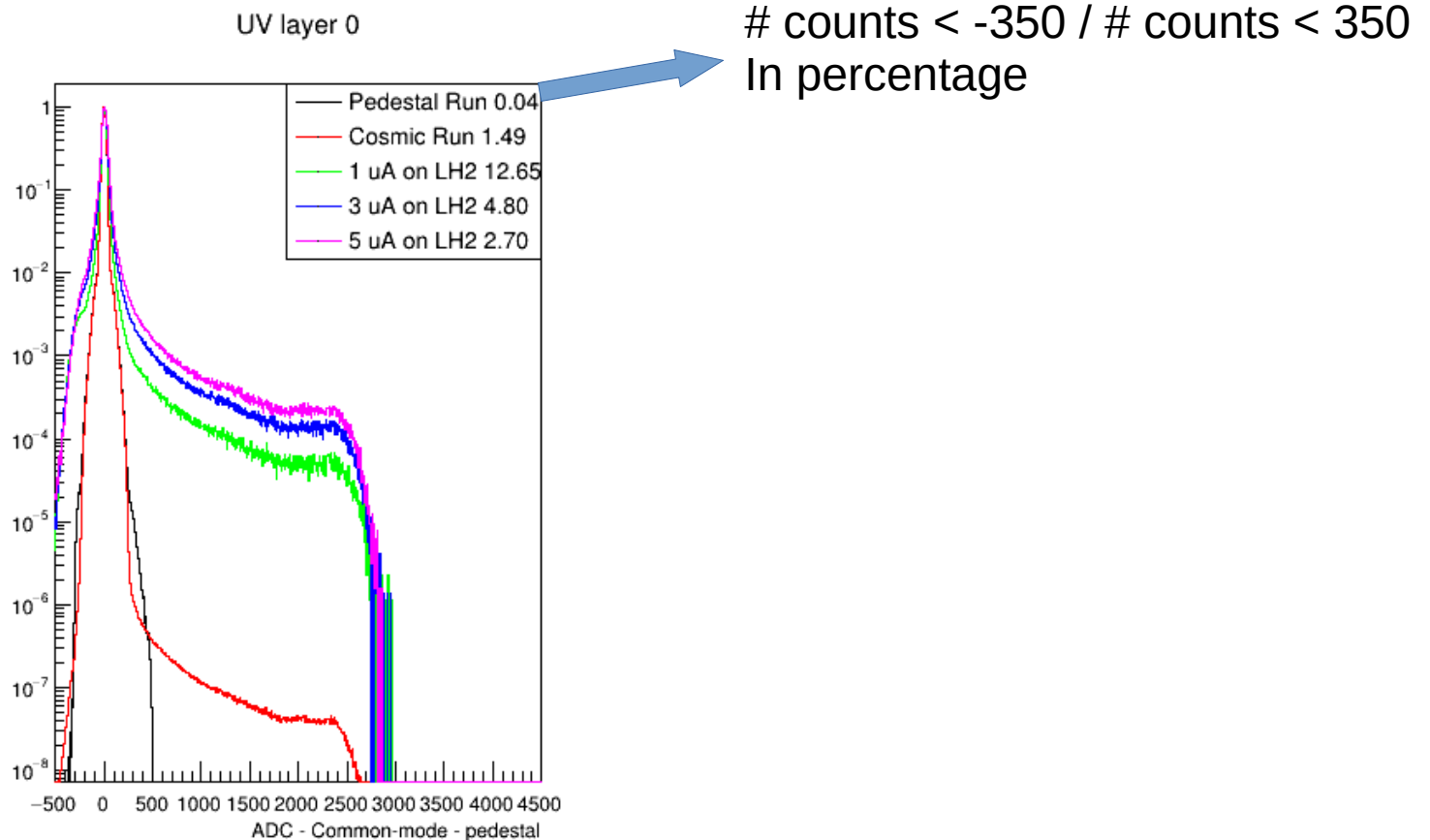


XY module 3



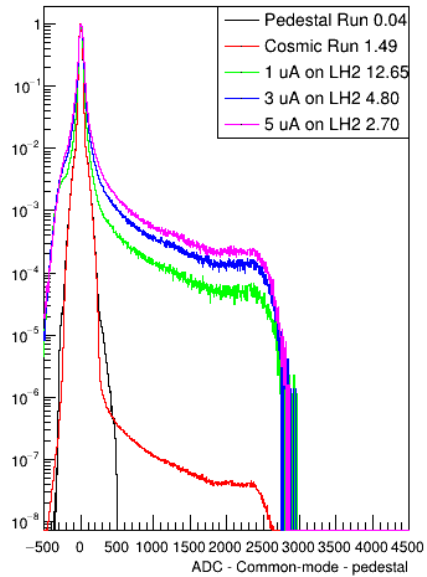
# Full Readout ADC Distributions

- The full ADC distribution can show the fraction of negative signals.
- The numbers in the legend show the fraction of negative signals to positive signals

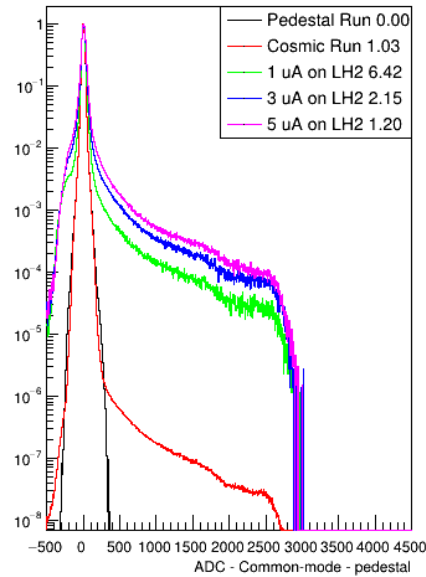


# Full Readout ADC Distributions

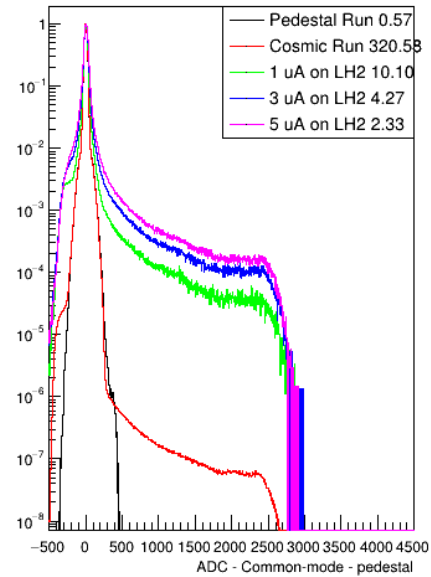
UV layer 0



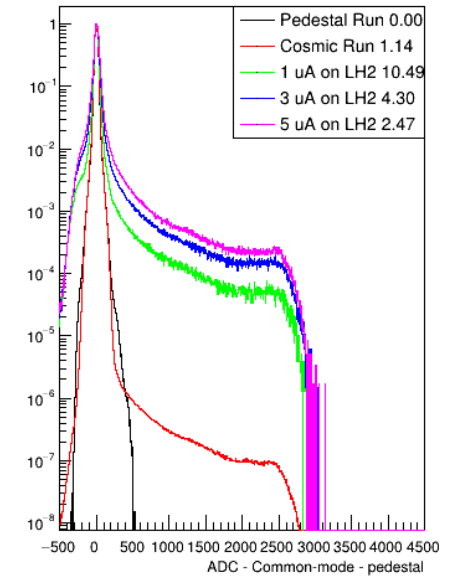
UV layer 1



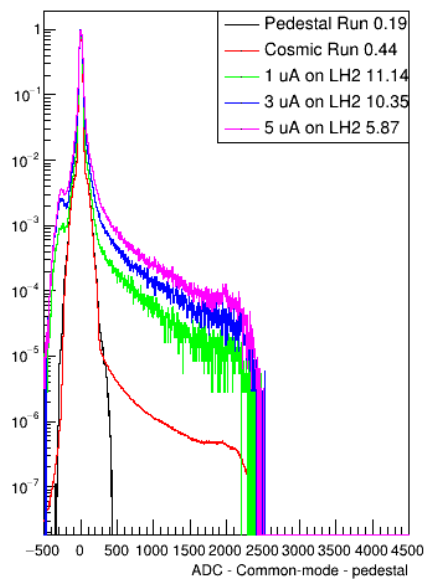
UV layer 2



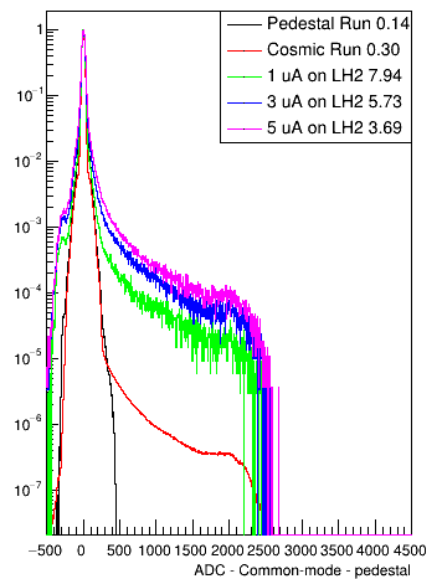
UV layer 3



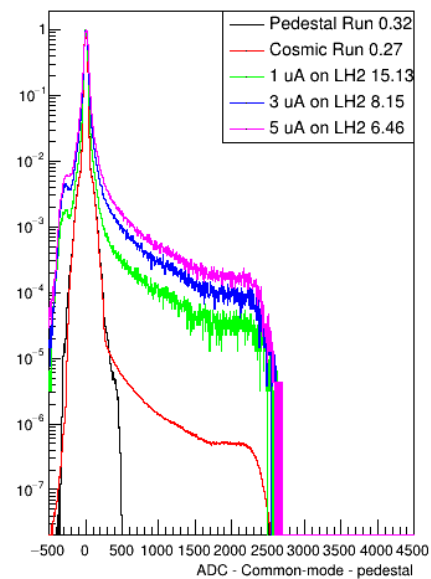
XY module 0



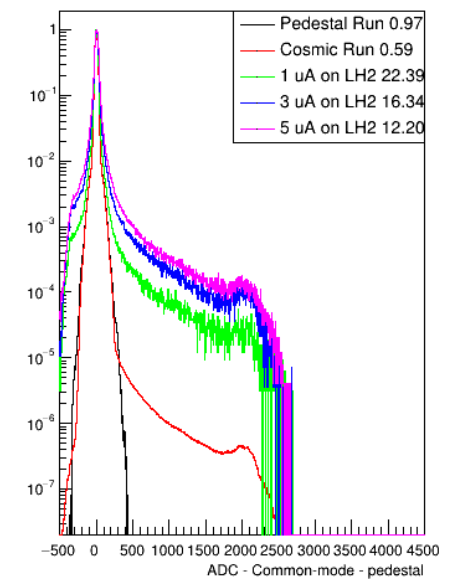
XY module 1



XY module 2



XY module 3

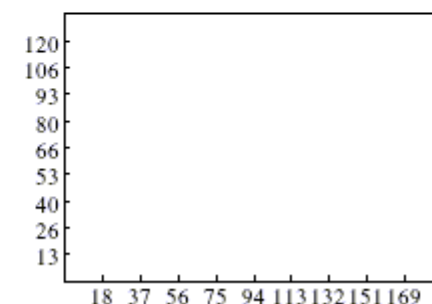
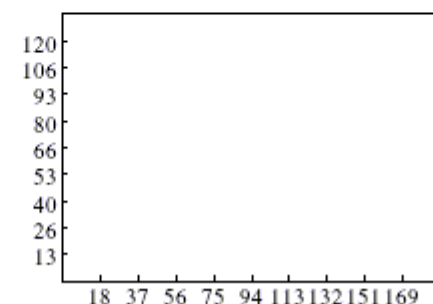
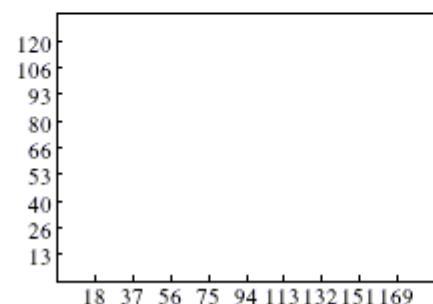
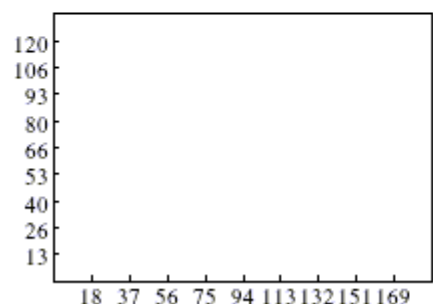
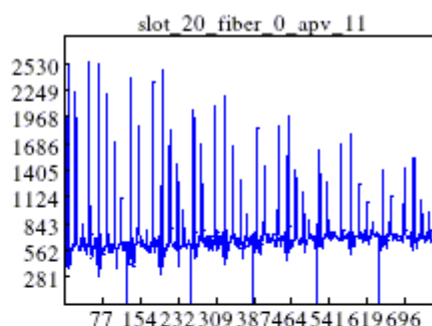
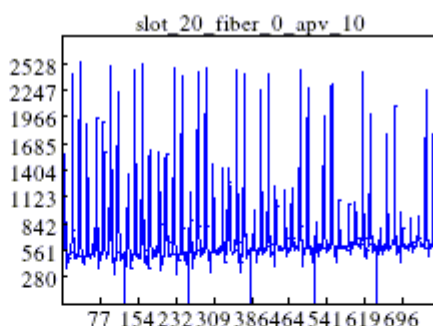
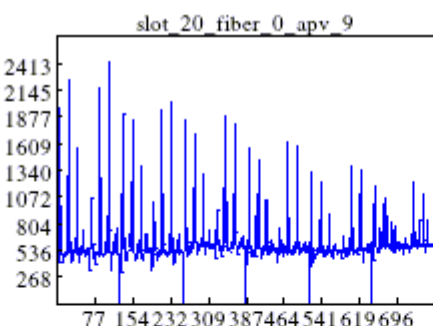
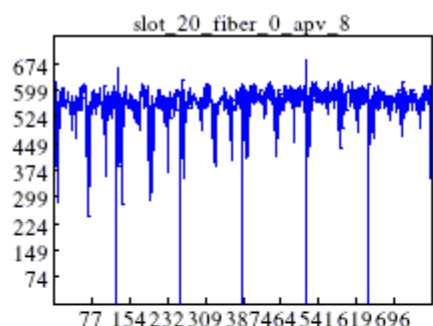
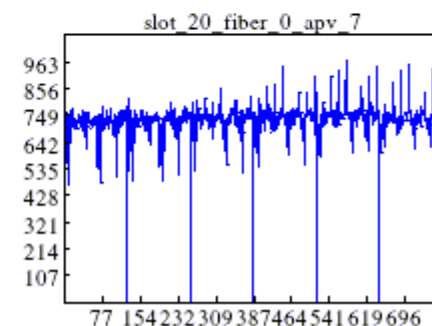
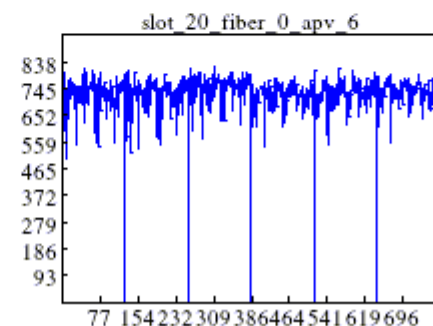
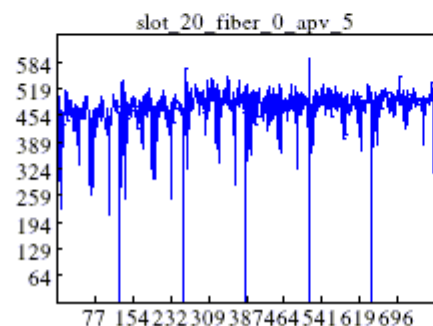
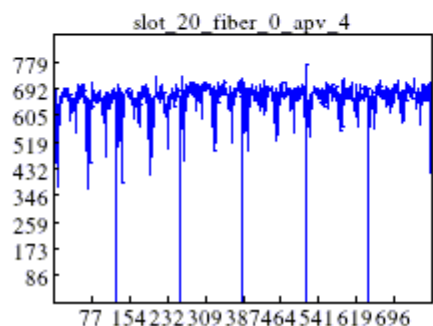
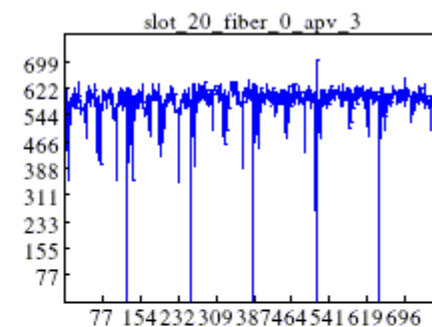
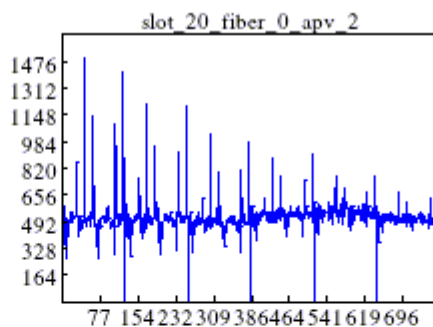
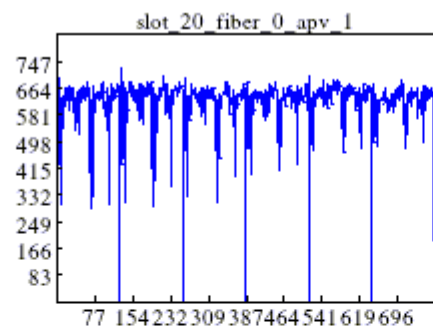
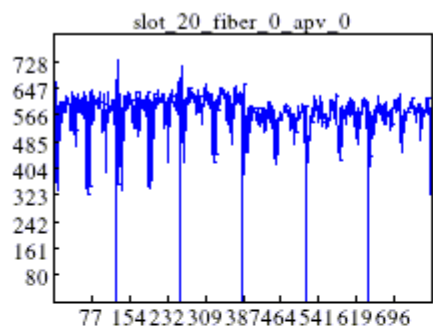


# Thoughts

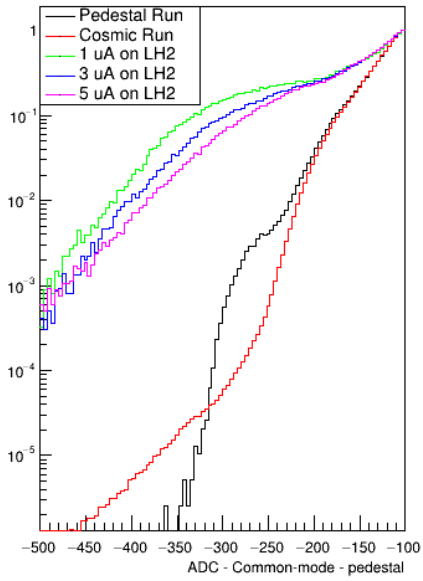
- The sagging of the CM clearly increases with beam current.
- Can get up to 30 ADC, and significantly effects our data.
  - This can likely be corrected using the 1/100 full readout events.
- It does not seem like the fraction of negative signals is increasing with beam current.
  - Seems contrary to the CM sagging.
  - Will need more statistics and more thorough analysis.
- Will be very useful to take beam data with full readout at different voltages.



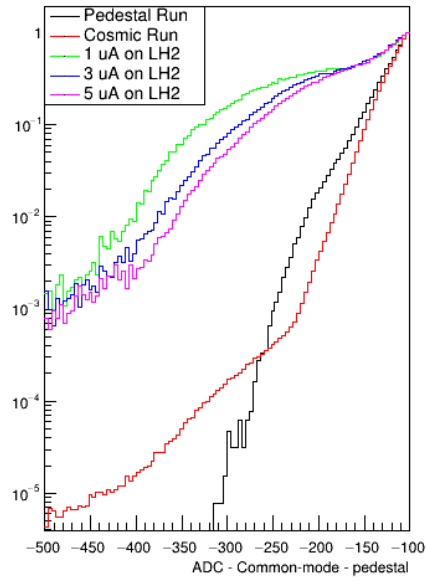
# Extra Slides



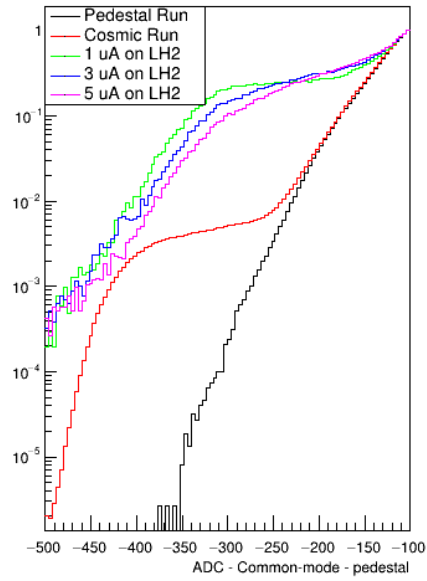
UV layer 0



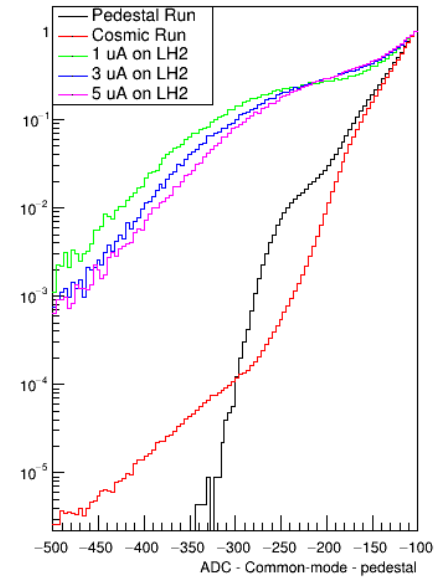
UV layer 1



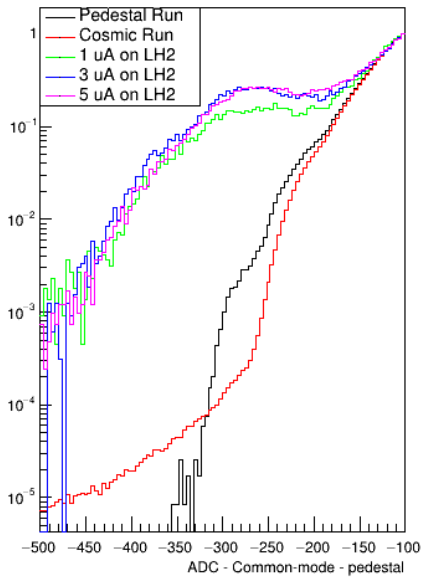
UV layer 2



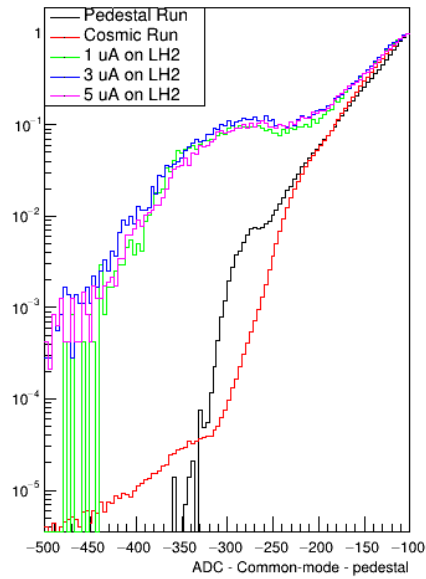
UV layer 3



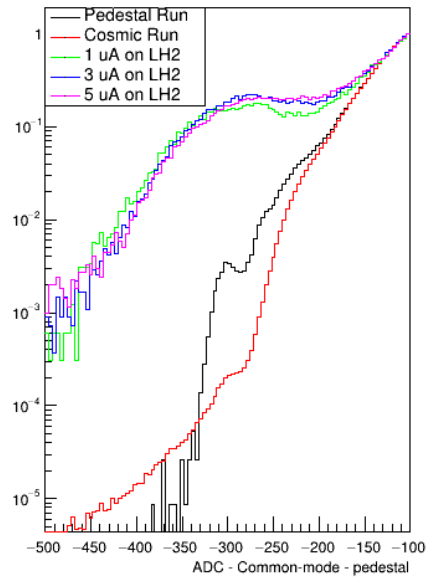
XY module 0



XY module 1



XY module 2



XY module 3

